

We claim:

## CLAIMS

- 1 1. An apparatus comprising:  
2 a parser to receive a packet and to generate a packet search request;  
3 a plurality of search resources, each search resource to determine a search response to the  
4 packet search request; and  
5 a switch to receive the packet search request from the parser and to multicast the packet  
6 search request to the plurality of search resources.
- 1 2. The apparatus of claim 1, wherein the switch is further configured to receive a search  
response from each of the plurality of search resources, to select one search response from the  
received search responses, and to transmit the selected response to the parser.
- 1 3. The apparatus of claim 2, wherein the parser is further configured to generate a  
modification request for the packet based on the search response.
- 1 4. The apparatus of claim 3, further comprising a plurality of packet modifiers, each packet  
modifier configured to modify the packet using the modification request.
- 1 5. The apparatus of claim 4, wherein the switch is configured to transmit the modification  
2 request from the parser to a packet modifier having a shortest queue.
- 1 6. The apparatus of claim 5, wherein the switch is further configured to transmit the  
2 modified packet from the packet modifier to the parser.
- 1 7. An apparatus comprising:  
2 a parser to receive a packet and to generate a packet request;

3 a plurality of packet resources, each packet resource to generate a packet response based  
4 on the packet request; and  
5 a switch to receive the packet request from the parser and to transmit the packet request  
6 to at least one of the plurality of packet resources.

1 8. The apparatus of claim 7, wherein the packet request is selected from the group  
2 consisting of: a packet search request, a packet modification request, and a session identification  
3 request.

10/05/2017 11:05:59 AM 1 9. The apparatus of claim 7, wherein the switch is further configured to receive a packet  
response from at least one of the plurality of packet resources, and to transmit the packet  
response to the parser.

10/05/2017 11:07:01 AM 2 10. The apparatus of claim 9, wherein the packet response is selected from the group  
consisting of: a search response, a packet modification, and a session identifier.

10/05/2017 11:07:01 AM 2 11. The apparatus of claim 9, wherein the packet resource is selected from the group  
consisting of: a packet modifier, a packet search device, and a session device.

1 12. An apparatus comprising:  
2 first means for receiving a packet and for generating a packet request;  
3 second means for generating a packet response based on the packet request; and  
4 third means for receiving the packet request from said first means and for transmitting the  
5 packet request to said second means.

1 13. The apparatus of claim 12, wherein the packet request is selected from the group  
2 consisting of: a packet search request, a packet modification request, and a session identification  
3 request.

1 14. The apparatus of claim 12, wherein said third means further comprises means for  
2 receiving a packet response from said second means, and for transmitting the packet response to  
3 said first means.

1 15. The apparatus of claim 12, wherein the packet response is selected from the group  
consisting of: a search response, a packet modification, and a session identifier.

16. The apparatus of claim 12, wherein said second means is selected from the group  
consisting of: a packet modifier, a packet search device, and a session device.

17. A method comprising:  
receiving a packet at a parser;  
generating a packet request at the parser; and  
4 using a switch to transmit the packet request from the parser to a packet resource.

1 18. The method of claim 17 further comprising:  
2 using the packet resource to generate a packet response based on the packet request.

1 19. The method of claim 17, wherein the packet request is selected from the group consisting  
2 of: a packet search request, a packet modification request, and a session identification request.

1 20. The method of claim 17 further comprising using the switch to transmit the packet  
2 response from the packet resource to the parser.

- 1 21. The method of claim 17, wherein the packet response is selected from the group  
2 consisting of: a search response, a packet modification, and a session identifier.
- 1 22. The method of claim 17, wherein the packet resource is selected from the group  
2 consisting of: a packet modifier, a packet search device, and a session device.
- 1 23. A method for state based packet processing comprising:  
2 allocating session/state storage when session processing is started;  
3 creating a session lock queue to control the order in which packets are processed;  
4 executing lock and unlock instructions to access semaphores stored in the session state  
storage to suspend and restart processing of packets;  
executing an instruction for processing of packets selected from the group consisting of:  
lock queue create, packet insert, packet delete, queue flush, and queue destroy; and  
de-allocating session/state storage when session processing is completed.

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